

WHAT IS CLAIMED IS:

1. A method of forming a thin film in a semiconductor device comprising steps of:
 - 5 performing one cycle of an atomic layer deposition method to form the thin film having a basic unit thickness on an upper portion of a substrate; and
 - performing one cycle of a plasma enhanced atomic layer deposition method to form the thin film having a basic unit thickness on the upper portion of the substrate,
- 10 wherein the steps are repeated to form the thin film having a desired thickness.
2. The method according to claim 1, wherein the ratio of repetition times of the atomic layer deposition method and the plasma enhanced atomic layer deposition method is adjusted to be N:M, thereby controlling the growth rate and material properties of the thin film, wherein N and M are integer numbers.,
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3. The method according to claim 1, wherein the plasma enhanced atomic layer deposition method and the atomic layer deposition method use different reaction gases.
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4. The method according to claim 1, wherein the plasma enhanced atomic layer deposition method and the atomic layer deposition method use different precursors.

5. The method according to claim 1, the one cycle of an atomic layer deposition includes: a first step (A) of supplying precursors into a deposition chamber to absorb the precursors on the surface of a substrate; a second step (B) of removing the remaining precursors that are not absorbed on the
5 substrate for cleaning; a third step (C) of supplying a first reaction gas and making it react with the precursors to form an atomic layer thin film; and a fourth step (D) of removing the first gas that does not react with the precursor and by-products of the reaction for cleaning.

10 6. The method according to claim 1, wherein the steps are alternatively repeated to form the thin film having a desired thickness.

7. The method according to claim 1, wherein the substrate is flexible type.

15 8. A method of forming a thin film in a semiconductor device comprising steps of:

(a) supplying precursors into a deposition chamber to absorb the precursors on the surface of a substrate;

20 (b) removing the remaining precursors that are not absorbed on the substrate for cleaning;

(c) supplying a first reaction gas and making it react with the precursors to form an atomic layer thin film; and

(d) removing the first gas that does not react with the precursor and by-products of the reaction for cleaning,

wherein the PEALD step of supplying reaction gases is included between the step (C) and the step (D), or after the step (D).

9. The method according to claim 1, an additional purge step is performed
5 after the step (D).